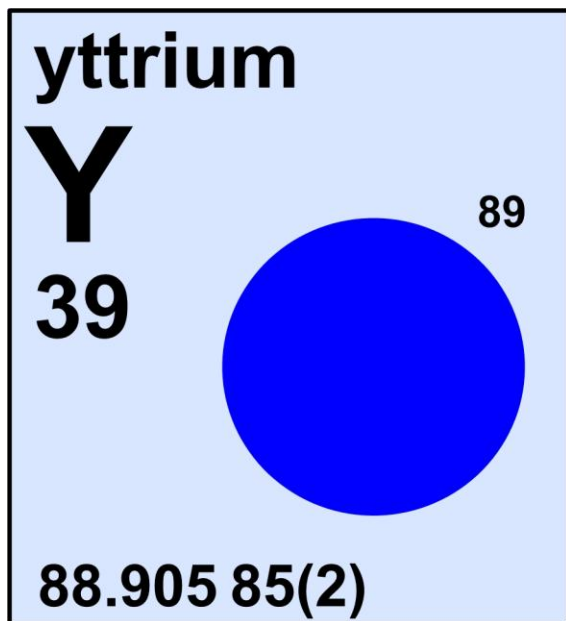
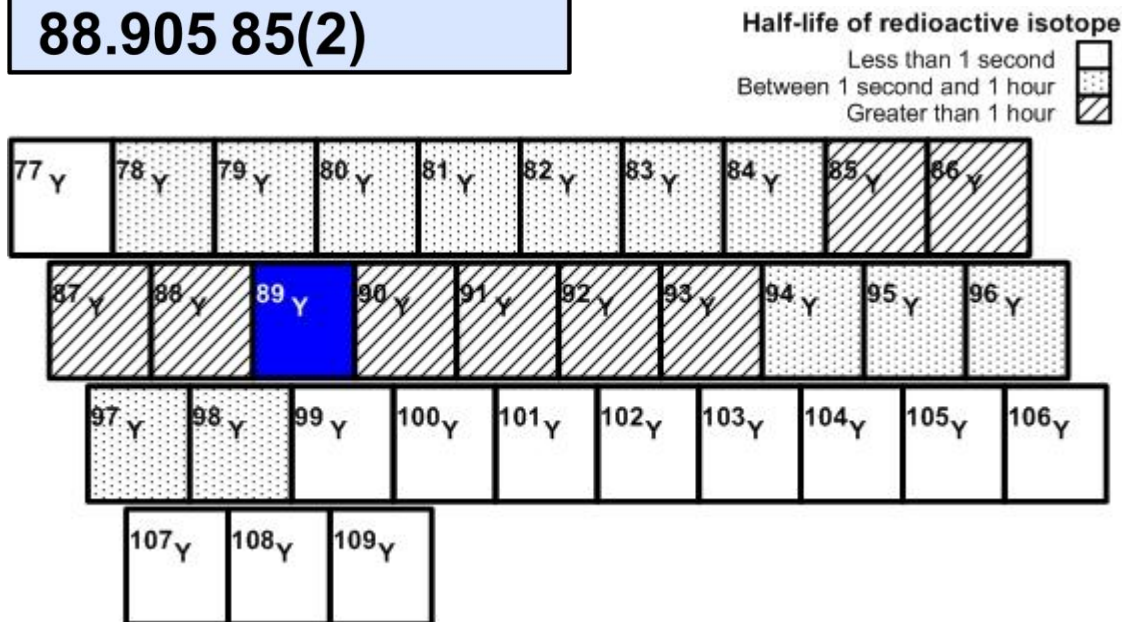


## yttrium



Stable isotope	Atomic mass*	Mole fraction
$^{89}\text{Y}$	88.905 8483	1.0000

\* Atomic mass given in unified atomic mass units, u.



## Important applications of stable and/or radioactive isotopes

### Isotopes in medicine

- Carbon nanotubes (CNT) labeled with  $^{86}\text{Y}$  were proven soluble when they were injected into mice. CNT's are nano scaled carbon tubes that are being examined to further research in the area of nanobiotechnology. The mice were injected via intravenous (through a vein) or intraperitoneal (directly into a body cavity) injection. With the  $^{86}\text{Y}$  CNT and then examined using a PET scan to observe whether or not the  $^{86}\text{Y}$  had been flushed from their system. The PET scan determined that the accumulation of  $^{86}\text{Y}$  were in the liver, kidney, and spleen with very rapid blood clearance.

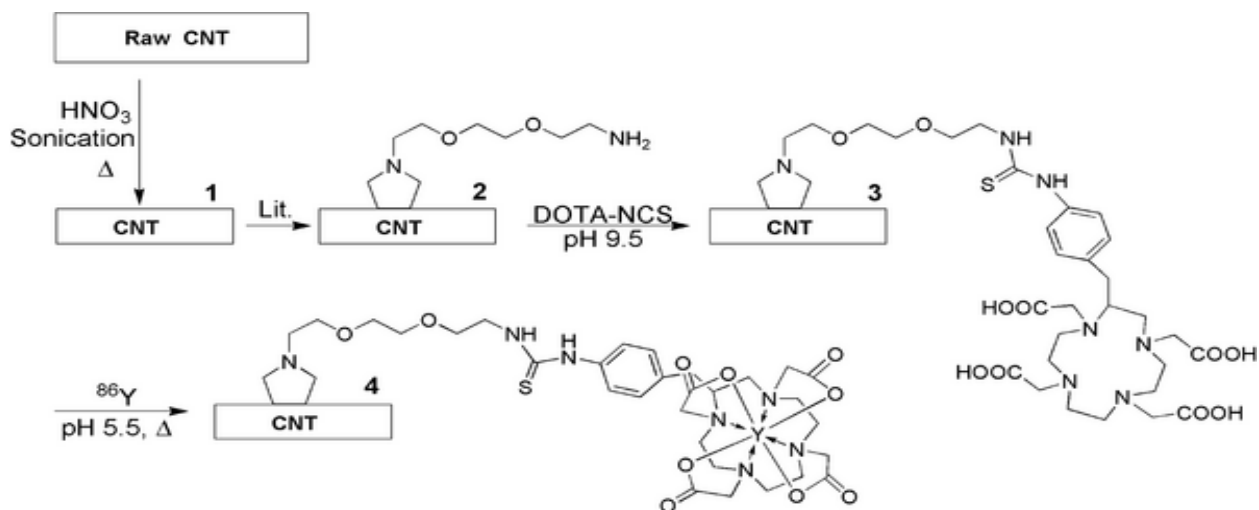


Figure 1: How to make  $^{86}\text{Y}$  CNT.

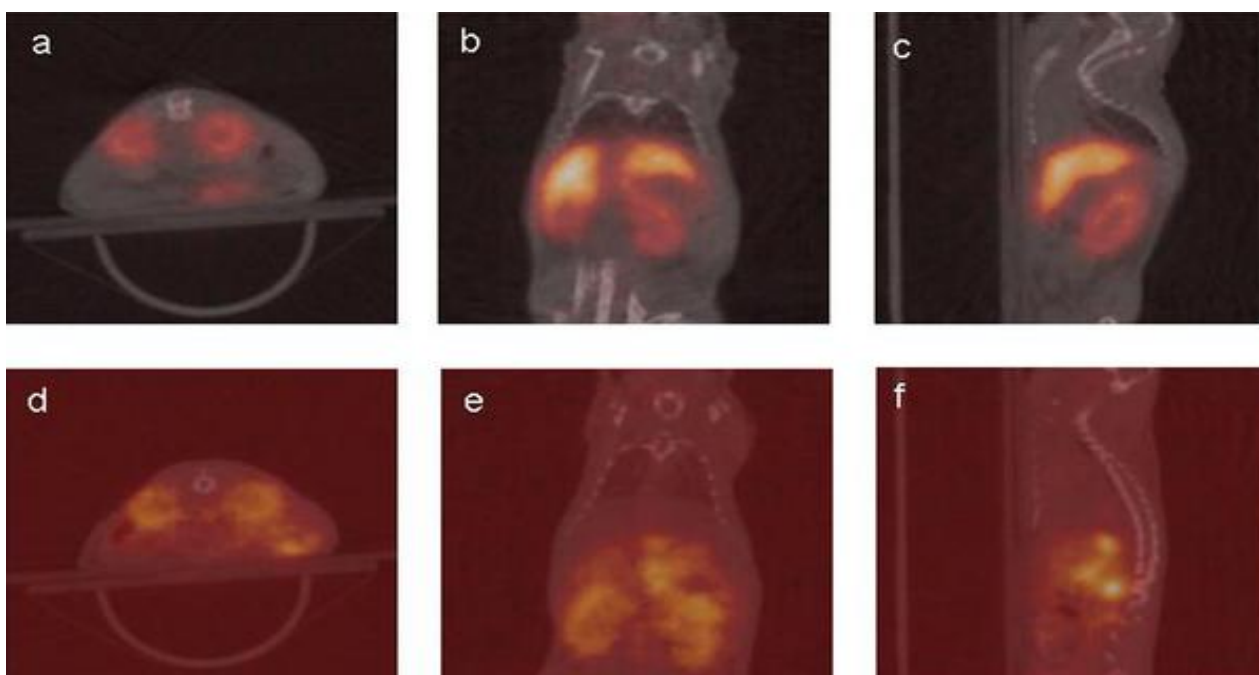


Figure 2: PET images of mice post injection of  $^{86}\text{Y}$ .

- 2) Radiomicrosphere therapy (RT) that uses  $^{90}\text{Y}$  microspheres is a proven therapy that helps treat hepatic/liver cancer. A study was done to between 2004 and 2007 to see what if gastrointestinal (GI) ulcers were a deathly side effect of these  $^{90}\text{Y}$  microspheres had in treating people with liver cancer. A group of 27 people varying in age and severity of cancer were the test subject in this study. The study proved that while GI ulcers were a noted but rare side effect of being treated with the  $^{90}\text{Y}$  microspheres, and if the ulcers did occur then they would need to be treated with aggressive surgical means.



Figure 3: Ultrapure  $^{90}\text{Y}$ .